

RAIN GAUGE RETROFIT

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OUTLINE

- Problem Statement
 - Needs/Specifications
 - Design Overview
 - Meeting Needs/Specifications
 - Test Plan
 - Final Design
 - BOM/Schedule
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PROBLEM STATEMENT

Having developed a sound design concept focus on making improvements and verifying functionality. Taking special consideration for environment conditions.

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TECHNICAL SPECIFICATIONS

Focus redesign on waterproofing.

	General	Specific	Acceptable
Function	Observe measured rainfall	Monitor changes in volume from height displacement	Changes as small as 1mm resolution
	Observe measured rainfall	Monitor changes over time.	Data sampled every 1 minute
	Operate independently	Have independent power source	Last six month without grid power
	Accuracy	The rain gauge must identify the empty state accurately	Built in calibration.
	Environmental	Operate under wet conditions	Operate under short submersion
Materials	Robust	Built to endure wide range of temperatures	Operate in -40C to 55C
	Low cost	Built using simple manufacturing methods	Less than \$100
	Longevity	Designed to last and be robust given wide array of conditions	Target life at least 10 years
Data Logger	Data format	Data logger needs to record data in an easy to read format	Comma separated file, allow for easy excel use
	Data retrieval	Data must be easily retrieved and stored under power loss conditions	On board microSD with fat32 support
	Status indicator	Gives visual key that it is operating correctly	Status led for power on and status led for recording.
	User interface	Provide an easy to use interface for setting up data logger	Power on button and start/stop record button
	Date Time Stamp	Tag each data point with the date and time of collection	RTC with independent battery

FINAL DESIGN OVERVIEW

- Systems and Subsystems
 - Interface
 - Key Features
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MEETING NEEDS AND SPECIFICATIONS

Battery: capacity = 2.6 A*Hr

of Batteries = 3



System Draw 1.5mA (actually 1.3~1.4)

Capacity*batteries/draw

Maximum operation life = 7.222 Months

MEETING NEEDS AND SPECIFICATIONS

Experimentation Validating Function

- Verify Current Linear Range
- Confirm Calibration
- Verify Resolution


MEETING NEEDS AND SPECIFICATIONS

Purchase Vs Manufacture

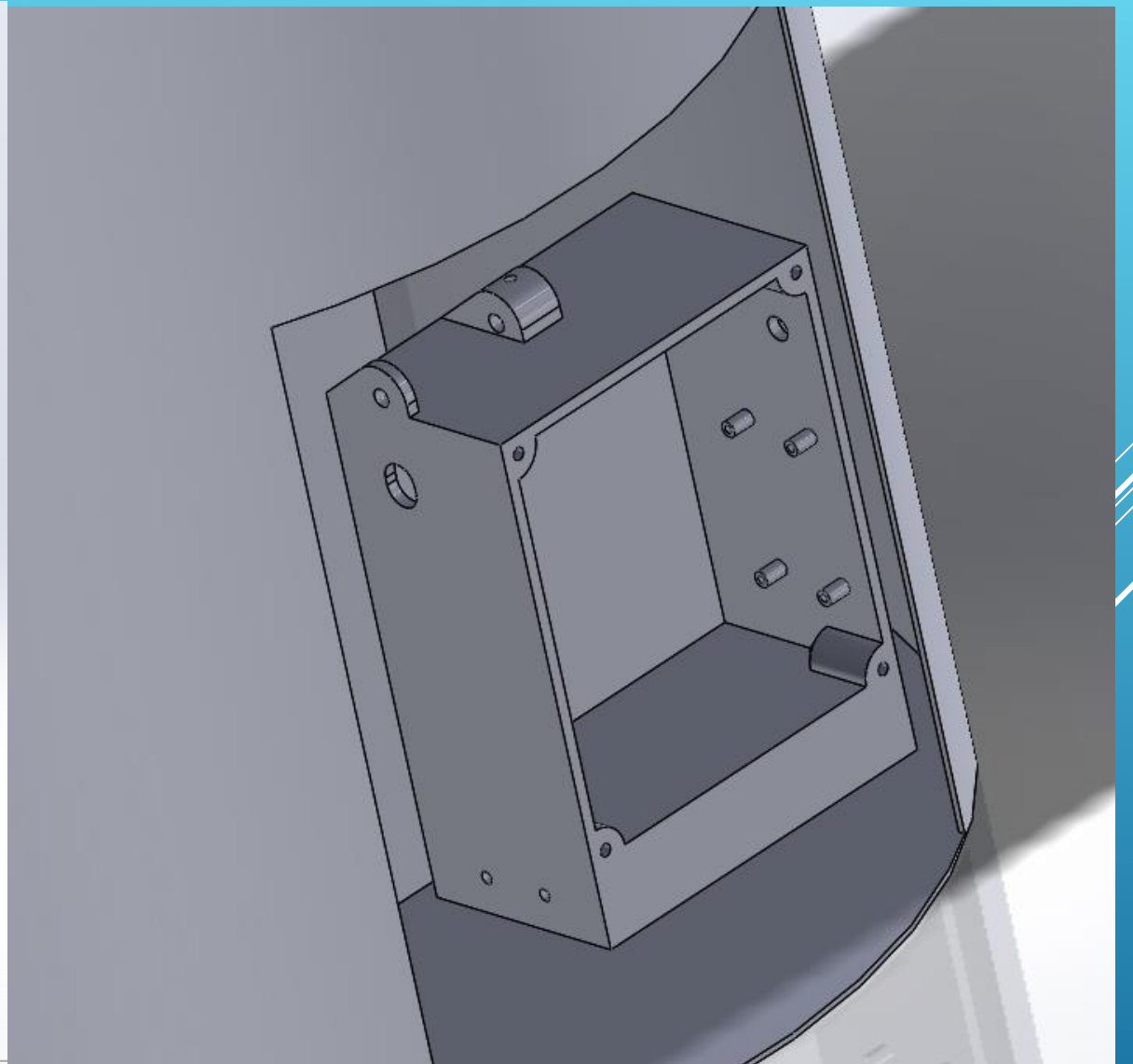
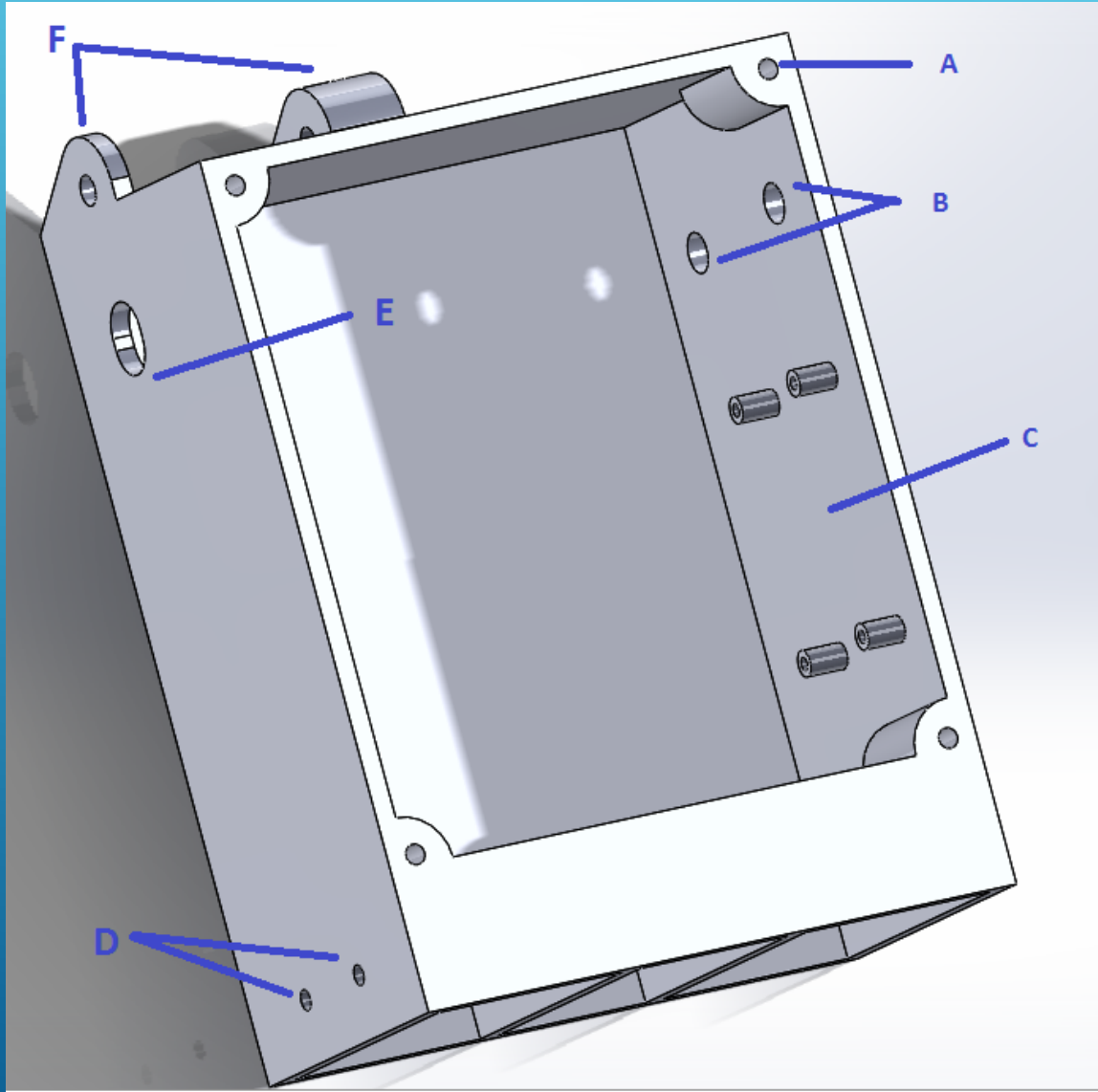
3D Printed parts VS Off the shelf project box

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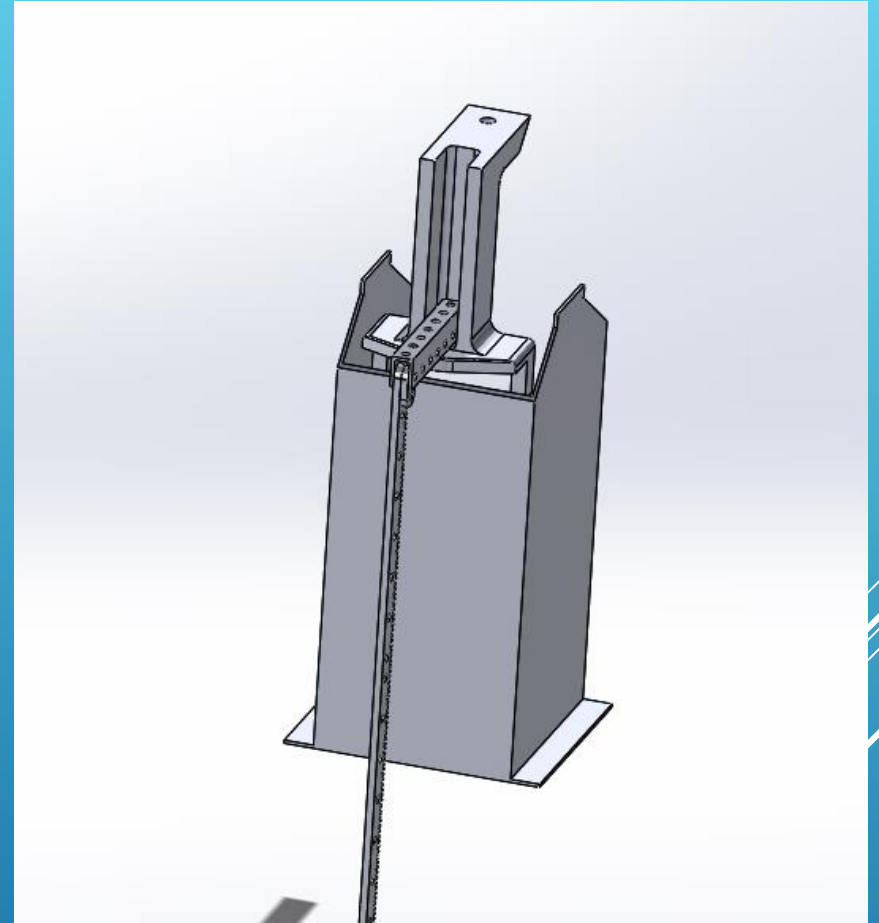
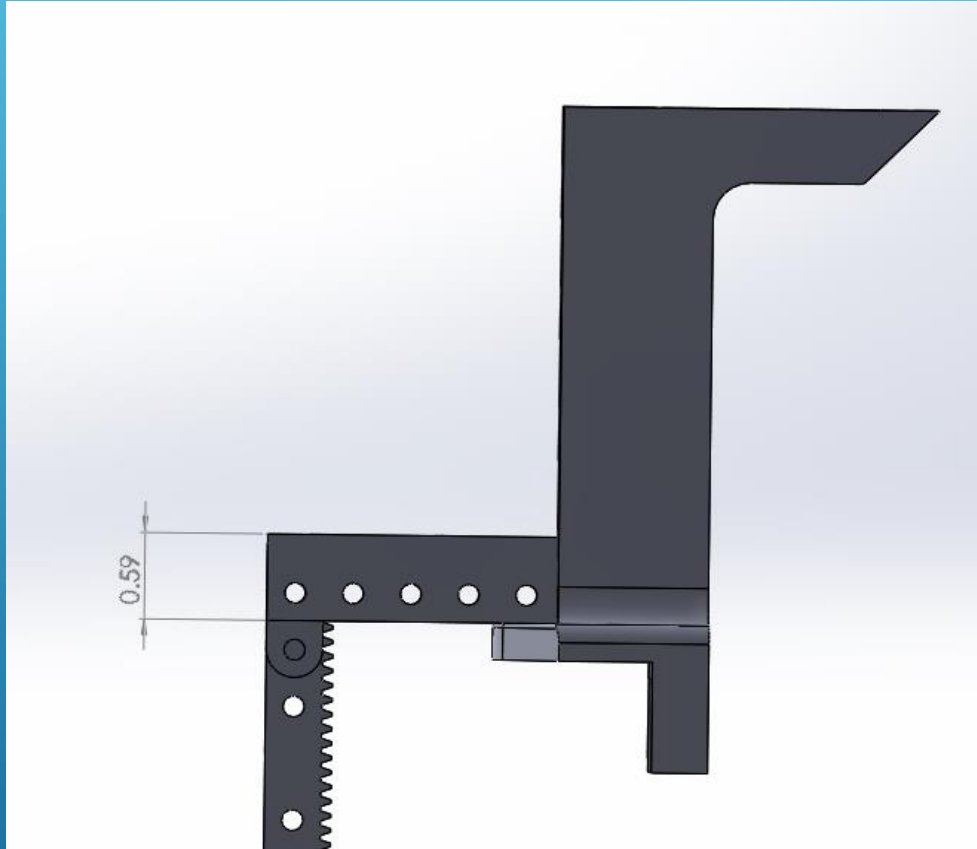
TEST PLAN

- Hot box experiment
 - Dunk tests
 - Extended operation
 - Power VS Sample rate
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FINAL DESIGN MODELS



FINAL DESIGN MODELS



BOM

Cost For 1 Unit: \$185

Includes \$65 3D Printed case

Cost For 100 Unit: \$170

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BUDGET

Current Status: \$1 600 of \$2000 Remaining

Optional Expense: Possible 3D printer

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SCHEDULE

Action Item	2/20/2015	3/6/2015	3/20/2015	4/3/2015	4/17/2015	5/1/2015	5/9/2015
Final 3D Print							
L-arm fabrication							
Final Assembly							
Baseline Test							
Environmental Test							
User Manual							

User Manual

- Item List
- Assembly Instructions
- Procedures + calibration
- Troubleshooting guide